

PCT

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT PCT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 40-02 WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US03/11010	International filing date (day/month/year) 10 April 2003 (10.04.2003)	Priority date (day/month/year) 10 April 2002 (10.04.2002)
International Patent Classification (IPC) or national classification and IPC IPC(7): C02F 1/28 and US Cl.: 210/667		
Applicant THE BOARD OF REGENTS OF THE UNIVERSITY OF NEVADA		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u> </u> sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none">I <input checked="" type="checkbox"/> Basis of the reportII <input type="checkbox"/> PriorityIII <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicabilityIV <input type="checkbox"/> Lack of unity of inventionV <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statementVI <input type="checkbox"/> Certain documents citedVII <input type="checkbox"/> Certain defects in the international applicationVIII <input checked="" type="checkbox"/> Certain observations on the international application		
Date of submission of the demand 05 November 2003 (05.11.2003)	Date of completion of this report 16 August 2004 (16.08.2004)	
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Peter A. Hruskoci Telephone No. 571-272-0987	

Form PCT/IPEA/409 (cover sheet)(July 1998)

I. Basis of the report**1. With regard to the elements of the international application:***☒ the international application as originally filed.☒ the description:pages 1-20 as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of _____.☒ the claims:pages 21-23, as originally filedpages NONE, as amended (together with any statement) under Article 19pages NONE, filed with the demandpages NONE, filed with the letter of _____.☒ the drawings:pages 1-9, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of _____.☐ the sequence listing part of the description:pages NONE, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of _____.**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.**4. ☒ The amendments have resulted in the cancellation of:**☒ the description, pages None☒ the claims, Nos. None☒ the drawings, sheets/fig None**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).****

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

2. CITATIONS AND EXPLANATIONS

Claims 1-3, 9, and 12-14 lack an inventive step under PCT Article 33(3) as being obvious over Misra et al.. Misra et al. disclose (see col. 4 line 4 through col. 6 line 42, and col. 11 lines 18-37) a method for removing arsenic from arsenic containing water substantially as claimed. The claims differ from Misra et al. by reciting that the composition comprises a metal salt hydroxide-gel. It is submitted that the composition formed in the water of Misra et al. appears to include a gelatinous precipitate of lanthanum and ferric hydroxides, which is considered indistinguishable from the recited metal salt hydroxide-gel. It would have been obvious to one skilled in the art to modify the method of Misra et al. by utilizing the recited composition, to aid in removing arsenic from water.

Claims 4, 5, 8, and 24 lack an inventive step under PCT Article 33(3) as being obvious over Misra et al. as above, and further in view of Wang et al.. The claims differ from Misra et al. as applied above by reciting the use of a DE coated filter, or a diatomaceous earth filter. Wang et al. disclose (see col. 2 line 50 through col. 3 line 26) that it is known in the art to utilize a diatomaceous earth filter to aid in removing contaminants from water. It would have been obvious to one skilled in the art to modify the method of Misra et al. by utilizing the recited filters in view of the teachings of Wang et al., to aid in separating water from the composition.

Claims 6, 7, 10, 11, 15-26 lack an inventive step under PCT Article 33(3) as being obvious over Misra et al. in view of Wang et al. as above, and further in view of Mills. The claims differ from the references as applied above by reciting the use of a DE filter bed, or DE coated hydroxide gels. Mills disclose (see col. 4 line 56 through col. 8 line 28) that it is known in the art to utilize a diatomaceous earth filter bed, and a composition including diatomaceous earth, aluminum hydroxide, and lanthanum chloride, to aid in filtering water, and in removing contaminants such as dissolved phosphate from water. It would have been obvious to one skilled in the art to modify the method the references as applied above by utilizing the recited filter bed and composition in view of the teachings of Mills, to aid in filtering water, and in separating dissolved contaminants from the water. The specific concentration, contact time, pH, and weight ratios utilized, would have been an obvious matter of process optimization to one skilled in the art, depending on the specific water treated and results desired, absent a sufficient showing of unexpected results.

Claims 27 and 36-38 lack an inventive step under PCT Article 33(3) as being obvious over Farrah. Farrah disclose (see col. 3 line 52 through col. 5 line 48) a method for removing heavy metals from heavy metal-containing solution, and method for making a DE-coated hydroxide substantially as claimed. The claims differ from Farrah by reciting that the solution is contacted with a metal salt hydroxide-gel, and the method for making forms a DE-coated hydroxide-gel. It is submitted that the adsorptive material utilized in Farrah appears to include ferric and aluminum hydroxides which are considered to be indistinguishable from the recited metal salt hydroxide-gel. It is further submitted that this material can include diatomaceous earth with an adsorptive surface comprising metal hydroxides, which is considered indistinguishable from the recited DE-coated hydroxide-gel. It would have been obvious to one skilled in the art to modify the method of Farrah by utilizing the recited metal salt hydroxide-gel and forming the recited DE-coated hydroxide-gel, to aid in removing heavy metals from water. The specific pH and aging of the composition utilized, would have been an obvious matter of process optimization to one skilled in the art, depending on the specific water treated and results desired, absent a sufficient showing of unexpected results.

Claims 28, 31-35, and 39 lack an inventive step under PCT Article 33(3) as being obvious over Farrah as above, and further in view of Misra et al.. The claims differ from Farrah by reciting that the metal salt hydroxide-gel comprises lanthanum and iron, and the composition comprises diatomaceous earth, a lanthanum salt, and iron salt, which is contacted with arsenic-containing water. Misra et al. disclose (see col. 4 line 4 through col. 6 line 42, and col. 11 lines 18-37) that it is known in the art to utilize a gelatinous precipitate of lanthanum and ferric hydroxides, to aid in removing arsenic and selenium for water. It would have been obvious to one skilled in the art to modify the method and composition of Farrah by utilizing the recited metal salt hydroxide-gel and composition in view of the teachings of Misra et al., to aid in removing arsenic and selenium from water.

Claim 29 and 30 lack an inventive step under PCT Article 33(3) as being obvious over Farrah as above, and further in view of Mills. The claims differ from Farrah as applied above by reciting the use of a DE filter bed. Mills disclose (see col. 4 line 56 through col. 8 line 28) that it is known in the art to utilize a diatomaceous earth filter bed, and a composition including diatomaceous earth, aluminum hydroxide, and lanthanum chloride, to aid in filtering water, and in removing contaminants such as dissolved phosphate from water. It would have been obvious to one skilled in the art to modify the method of Farrah by utilizing the recited filter bed in view of the teachings of Mills, to aid in filtering water, and in separating dissolved contaminants from the water.

Claims 1-39 meet the criteria set out in PCT Article 33(2), because the prior art does not disclose the method steps or compositions recited in the instant claims.

Claims 1-39 have industrial applicability and meet the criteria set out in PCT Article 33(4), because the methods can be used in industry to remove arsenic and heavy metals from water.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Claims 4, 6-8, 15, 24, 29, 36, 37, and 39 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claims are indefinite for the following reason(s): In claims 4, 6-8, 15, 24, 29, 36, 37, and 39 "DE" is vague and indefinite because it is unclear how this term further limits the claims. In claim 24 "diatameous" is erroneous and should be changed to - diatomaceous -.